Scientist

Education

- PhD, 2000, The University of Manitoba, Winnipeg, Canada, Groundwater hydrology.
- M.Sc., 1996, International Institute for Hydraulic and Environmental Engineering, Delft, Netherlands, Hydrological Engineering.
- B.Eng., 1985, China University of Geosciences, Wuhan, China, Applied Geophysics.

Research Interests/Activities

- Developing parallel computing codes for large-scale, multi component, multiphase fluid and heat flow simulation.
- Large-scale (multi-million-gridblock model) modeling studies for groundwater flow and contaminant transport in saturated or unsaturated porous and fractured media.
- Numerical modeling studies for CO2 geological sequestration, nuclear waste disposal and geothermal reservoir investigation.
- Investigations of gas production potential from gas hydrate deposits.

Software productions

- TOUGH2-MP (including 13 EOS modules), the parallel version of general purpose multiphase simulator TOUGH2.
- TMVOC-MP, a parallel numerical simulator for three-phase non-isothermal flows of multicomponent hydrocarbon mixtures in porous/fractured media.
- pT+H, the parallel version of TOUGH+HYDRATE, a gas-hydrate reservoir simulator.
- TOUGH+CO2, the new generation of TOUGH family code for simulation CO2 sequestration in saline aquifer.
- MSFLOW-MP, the parallel version of MSFLOW, a gas and oil reservoir simulator.

Recent publications

- Zhou, Q., J.T. Birkholzer, E. Mehnert, Y.-F. Lin, and **K. Zhang**, Modeling basin- and plume-scale processes of CO_2 storage for full-scale deployment. LBNL-2788E. Ground Water (published online 2009), doi: 10.1111/j.1745-6584.2009.00657.x, 2010.

- **Keni Zhang**, George Moridis, Karsten Pruess, 2009, TOUGH+CO2: A multiphase fluid flow simulator for CO2 Geologic Sequestration in Saline aquifers, submitted to Computers & Geosciences.
- Hajime Yamamoto, **Keni Zhang**, Kenzi Karasaki, Atsunao Marui, Hitoshi Uehara, and Noriaki Nishikawa, 2009, Numerical investigation for the impact of CO2 geologic sequestration on regional groundwater, Vol. 3, P586-599, International Journal of Greenhouse Gas Control.
- Moridis, G.J., Reagan, M.T., Kim, S.-J., Seol, Y., and **Zhang, K**. 2009. Evaluation of the Gas Production Potential of Marine Hydrate Deposits in the Ulleung Basin of the Korean East Sea. *SPE J.* SPE-110859-PA
- **Zhang, K.**, G.J. Moridis, Y.-S. Wu, and K. Pruess, A domain decomposition approach for large-scale simulations of flow processes in hydrate-bearing geologic media. LBNL-1576E. Proceedings of the 6th International Conference on Gas Hydrates (ICGH 2008), 2008.
- **Zhang, K**., C. Doughty, Y.-S. Wu, and K. Pruess, Efficient parallel simulation of CO_2 geologic sequestration in saline aquifers. LBNL-63316. SPE-106026, Presented at SPE Reservoir Simulation Symposium, Society of Petroleum Engineers (SPE), Houston, TX. February 26–28, 2007.
- Yu-Shu Wu, Guoping Lu, **Keni Zhang***, L. Pan, and G. S. Bodvarsson, 2007, Analyzing unsaturated flow patterns in fractured rock using integrated modeling approaching, LBNL-54006, Hydrogeology Journal, Vol. 15, No553-572 .
- **Zhang, K**, YS Wu, And J. Houseworth, 2006, Sensitivity Analysis Of Hydrological Parameters In Modeling Flow And Transport In The Unsaturated Zone Of Yucca Mountain, Hydrogeology Journal, Vol. 14, No. 8., pp. 1599-1619.
- Yu-Shu Wu, **Keni Zhang***, and Hui-Hai Liu, 2006, Estimating Large-Scale Fracture Permeability of Unsaturated Rock Using Barometric Pressure Data, LBNL-57614, Vadose Zone Journal, 5:1129-1142 .
- Yu-Shu Wu, S. Mukhopadhyay, **K. Zhang***, and G. S. Bodvarsson, 2006, A Mountain-Scale Thermal-Hydrologic Model for Simulating Fluid Flow and Heat Transfer in Unsaturated Fractured Rock, Journal of Contaminant Hydrology, 86: 128–159 .
- **Zhang**, **K**., YS Wu, and L. Pan, 2006, Temporal Damping Effect of the Yucca Mountain Fractured Unsaturated Rock on Transient Infiltration Pulses, LBNL-57539, Journal of Hydrology, V327, 235-248.
- Wu, Y. S., G. Lu, **K. Zhang**, and G. S. Bodvarsson, 2004, A Mountain-Scale Model for Characterizing Unsaturated flow and Transport in Fractured Tuffs of Yucca Mountain, Vadose Zone Journal, Vol. 3, pp.796-805.
- **Zhang, K.**, Y.S. Wu, G.S. Bodvarsson, and H.H. Liu, 2004, Flow Focusing in Unsaturated Fracture Networks: A Numerical Investigation, Vadose Zone Journal, 3:624-633
- Pan, L., Y.S. Wu, **K. Zhang**, 2004, Flow Diversion and Focusing in Unsaturated fractured Tuffs at Yucca Mountain, Nevada, Steady State Analysis, Vadose Zone Journal, 3:233-246.
- **Zhang, K**., Y.S. Wu, and G.S. Bodvarsson, 2003, Parallel Computing Simulation of Fluid Flow in the Unsaturated Zone of Yucca Mountain, Nevada, Journal Of Contaminant Hydrology, 62-63, 381-399

- **Zhang, K.**, Y.S. Wu, G.S. Bodvarsson, and H.H. Liu, 2003, Determination of Unsaturated Flow Paths in a 2-D Randomly Distributed Fracture Network, in *Groundwater Quality Modeling and Management under Uncertainty*, edited by Sirkanta, Mishra, American Society of Civil Engineers, ISBN: 0-7844-0696-0.